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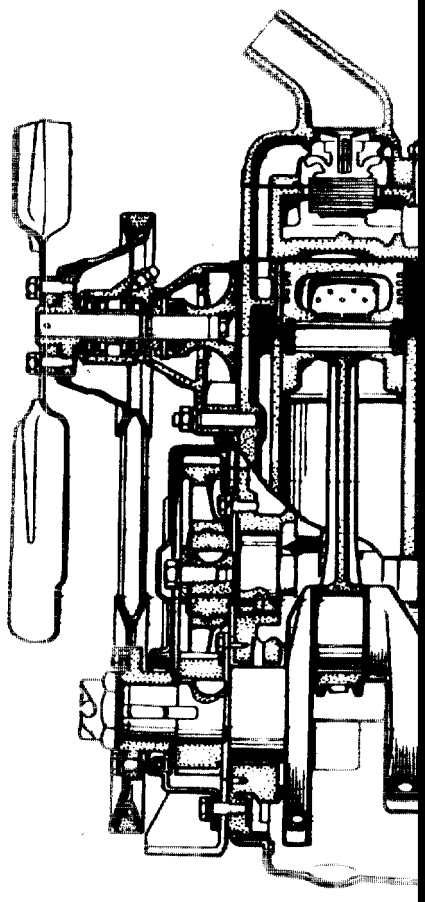
RUSSIA'S MOTOR INDUSTRY

TECHNICAL DATA OF THE ZIM, ZIS 110 AND MOSKVITCH : PART II

By GORDON WILKINS

(The first part of this article was published in the February 27 issue)



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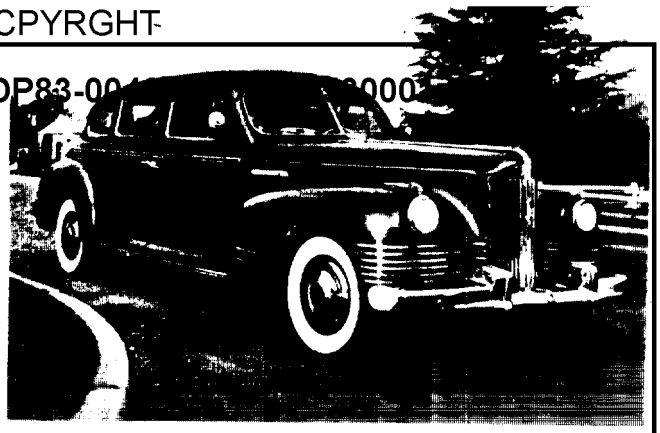


Left : Photographed in the streets of Moscow, the ZIM is a big modern six-seater limousine with two additional folding seats. It has a six-cylinder side valve engine, fluid coupling and synchromesh gear box. Right : Largest and most luxurious of the Soviet cars, the ZIS 110 limousine is used by top members of the Russian Government and the diplomatic corps. It is copied from the Packard, which is widely used by Soviet diplomats outside Russia.

factors which caused a high rate of rejects in machining operations and foundry work, but the régime now offers very high rewards indeed, in both cash and improved living conditions, to the skilful and diligent worker. In this respect Russia now seems to be following a different course from Britain.

The four Russian cars now in production each cater for a different sector of the market. They have not undergone any significant change since production started, and will probably continue to be made for a long time to come. The ZIS 110, based on the Packard, was announced in 1945 and production got under way in 1946. The Pobieda, described in *The Autocar* on February 27, was revealed in March, 1947, and the Moskvitch, in reality the German Opel Cadet, was in production by 1948. Last to emerge was the ZIM, introduced in 1950.

Car production is concentrated at two main centres, Moscow and Gorky. The great Stalin works in the Proletarsky district of Moscow makes the ZIS 110, largest and most luxurious of the Soviet cars, while the smallest and cheapest car, the Moskvitch, is also made in the capital city.

The Pobieda is built in the great Molotov works in Gorky, formerly Nijni Novgorod (not in Moscow, as was stated in the first part of this article). The Gorky factory is one of the showpieces of the Soviet automobile industry. This factory also makes the ZIM, the second original post-war Russian car design. It is scheduled for considerable further expansion, and will eventually be turning out a thousand vehicles a day.

These factories also build trucks and buses, while other great factories elsewhere in the Soviet turn out large numbers of light commercial vehicles, heavy trucks and tractors. Production figures are usually disguised by quoting percentage improvements in the usual Soviet manner. The 1946 output was 36.8 per cent higher than that for 1945, the output for 1947 was 30.1 per cent up on 1946, 1948 was 48.3 per cent higher than 1947, and so on. However, it seems probable that Russia has already equalled or surpassed Britain's total annual vehicle output, although naturally, cars form a very much smaller proportion of the total.

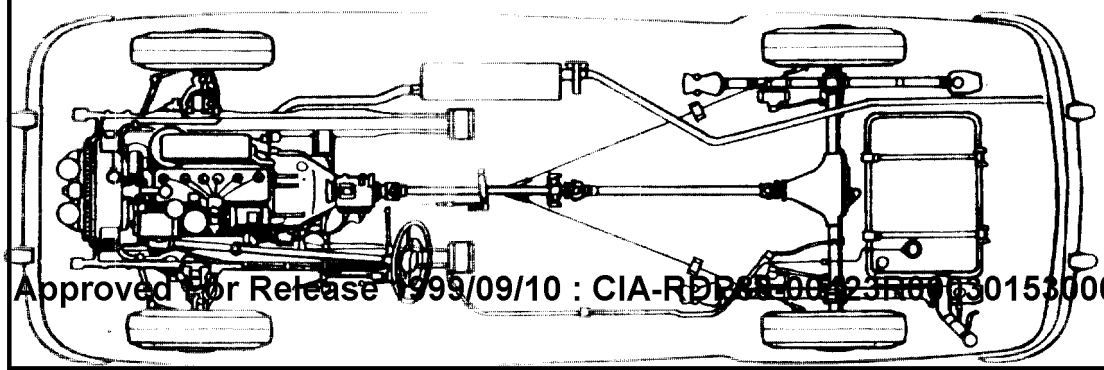
The design team at Gorky which produced the Pobieda was headed by chief designer A. A. Lipgart, and, after examination of the works drawings of the ZIM, it seems that there are so many points of similarity, despite the different characters of the two cars, that the Pobieda design team probably had a lot to do with the ZIM, too.

Similarities

A comparison of the ZIM engine, transmission and suspension with the drawings of the Pobieda published on February 27 will reveal many common features. Like all car engines in production in the Soviet Union, the ZIM is a side-valve unit, and like the four-cylinder Pobieda it has a gear-driven camshaft on the left-hand side. Other points where it resembles the Pobieda include the four-ring pistons with two slotted oil control rings, the centrifugal cooling impellor, the thermostat in a casting bolted to the front end of the cylinder head, and the gear-type oil pump with floating intake. Relatively long, dry cylinder liners are used, extending for the full travel of the piston rings, but in the ZIM the liners cover only the area of maximum wear, where the effects of corrosion from the products of combustion are most destructive. Short liners of this kind were used by Standard in England just before the war. The carburettor on the ZIM is a modern twin-choke down-draught type with annular float chamber to prevent starvation through surge when braking or cornering.

Like the Pobieda, the ZIM seems to have a modern unit body-chassis structure with a detachable front end frame on which the power unit and front suspension are mounted. In the last year or two Western designers have been turning away from the idea of making the front end of unit construction cars detachable, as it entails extra weight, but a fully detachable front end has just been seen on the Fiat 1100 in Italy, so the Russians are not alone in favouring this method, which does simplify repair work after an accident. Front suspension on the ZIM resembles that of the Pobieda in its general layout, with a built-up lower wishbone and a smaller upper wishbone shaped like a horseshoe pivoted on a hydraulic damper. Rear suspension is by gaitered half-elliptic springs with rubber-bushed shackles.

As the second largest car built in the Soviet Union, the ZIM is reserved for senior government officials and executives and there is no evidence of its being sold to private owners. It has smart modern lines, but its mechanical conception is rather conservative, with coil spring front suspension, a six-cylinder side-valve engine and half-elliptic rear suspension. The power output of the 3.48-litre unit is given as 94 b.h.p. at 3,600 r.p.m. and the car is claimed to achieve a maximum speed of 78 m.p.h. with an average fuel con-



General layout of the ZIM showing the sub-frame carrying the front suspension and power unit, the two-piece propeller-shaft with centre bearing and the half-elliptic rear springs. The engine is mounted well forward, with the third cylinder level with the wheel centres.

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sumption of 15-16 m.p.g. The compression is low at 6.7 to 1, as the car has to run on fuel of fairly low octane rating.

For the ZIM transmission the Soviet designers have adopted a scheme which was used on the pre-war Singer Eleven in England and which had a temporary popularity in the U.S.A. just before the introduction of fully automatic transmissions; they combine a fluid coupling with a single-plate dry clutch and an orthodox synchromesh gear box. This type of transmission has recently been revived on the Italian Fiat 1900, but whereas the Italian car has five speeds the powerful ZIM employs three, like American cars. Top and second gears have synchromesh engagement, and the gears are changed by a conventional control on the steering column.

This is a practical arrangement for a big car with a good reserve of power, because it permits two-pedal control for a good part of the time. The car can be brought to a standstill by using the brake only, and moved away again simply by pressing the throttle. The clutch pedal is needed only when changing gear. The efficiency of such a transmission is much higher than that of a torque converter, and the Russians claim that the slip experienced with the fluid coupling varies between 2 and 2.5 per cent over the normal operating range of 2,500 to 3,000 r.p.m. This coincides with experience in the West. Behind the gear box is a two-piece propeller-shaft, with a bearing mounted just behind a point level with the front seats. Final drive is by modern hypoid bevel, which lowers the pinion shaft and helps to reduce the height of the propeller-shaft tunnel to the minimum.

The ZIM is built primarily as a six-seater limousine with folding occasional seats which bring the total capacity up to eight people, but it is a more compact car than the big Packard-based ZIS and is much lighter, the difference in weight being approximately 1,650 lb. In general external appearance the ZIM obviously owes something to Cadillac and Buick style influence and the bonnet can be opened from either side by means of recessed latches in streamlined mountings similar to those on the Buick. All doors shut on the centre pillars, and the front doors have conventional swivelling ventilation panels.

Packard-based

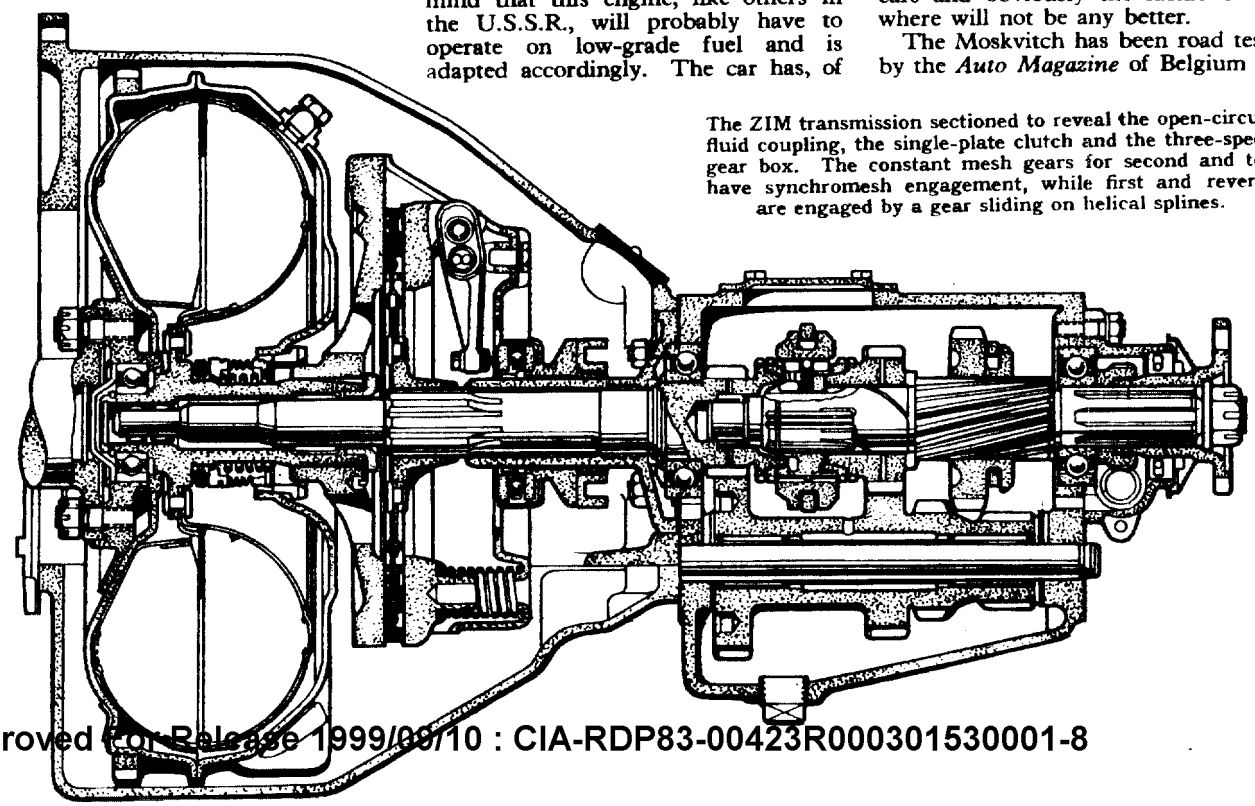
The ZIS 110, as mentioned in the first part of this article, is based upon the Packard Custom Eight and is reserved for the top members of the government and diplomatic corps. Some examples naturally have bullet-proof glass and shaded windows. This is the car in which the members of the Politburo commute between the Kremlin and their *dachas* or country villas under heavy police escort. You cannot buy a ZIS; you have to get yourself a job which has one thrown in among the other amenities. The more distinguished invalids do, however, achieve an occasional ride in a ZIS, as a few of them have been fitted out as ambulances. There are also a few four-door convertibles.

American observers who have had a chance to examine a sample captured in Korea say that the manufacturing tolerances are more liberal than those used on the Packard and the engine power is less, as the claimed output is only 137 b.h.p. as against 160 for the Packard, but it has to be borne in mind that this engine, like others in the U.S.S.R., will probably have to operate on low-grade fuel and is adapted accordingly. The car has, of course, a separate chassis with conventional wishbone front suspension and the engine is a straight-eight side-valve unit driving through a plate clutch and a three-speed synchromesh gear box. Rear springs are half-elliptic. Maximum speed is claimed to be 87 m.p.h. and average fuel consumption is about 10 m.p.g.

Finish and equipment of the ZIS 110 undoubtedly reach quite a high standard. It is nicely upholstered in cloth at front and rear, and is equipped with such amenities as radio and hydraulically operated window lifts. It has Russian-made 7.50-16in white-wall tyres.

For the ordinary citizen the ZIS and the ZIM are out of the question, and the Pobieda is unattainable except for a relatively few successful and influential people; the average Russian's hopes of car ownership, therefore, cannot go higher than the Moskvitch, the smallest car built in the U.S.S.R. at the moment. Its name means Son of Moscow and it is made in the U.S.S.R. capital, but it is an adopted son, as it is really the Opel Cadet of 1939. It is made with jigs and tools which the Russians took from Germany as reparations at the end of the war, thus leaving General Motors at Russelheim with no small car to compete against the Volkswagen, Ford Taunus and D.K.W. The Moskvitch is sold to the intelligentsia, the Stakhanovite shock workers, yes, and even to journalists, apparently, but *Pravda* admitted some time ago that the first purchasers were not to be envied. Sales facilities are very limited and it appears that people travel great distances to place their orders at the showrooms in Moscow. Moreover, they say there is nowhere in the whole of Moscow to service the cars and obviously the facilities elsewhere will not be any better.

The Moskvitch has been road tested by the *Auto Magazine* of Belgium and



The ZIM transmission sectioned to reveal the open-circuit fluid coupling, the single-plate clutch and the three-speed gear box. The constant mesh gears for second and top have synchromesh engagement, while first and reverse are engaged by a gear sliding on helical splines.

Interior views of the ZIS 110 limousine show the comfortable cloth upholstered seats and thick pile carpets. Visible on the facia are the wide, shallow speedometer and centrally mounted radio. The gear lever is on the right, under the steering wheel. Above the ashtray in the rear armrest are the switches for the hydraulically operated windows.

nd maintenance will, rease as more cars come ut there is no sign what- oviet citizen will be given ars. He will take what cording to his value to his position in Soviet

AR SPECIFICATIONS

ZIM

l, 82 × 110 mm (3,480 c.c.). ar-driven camshaft. Four- ft. Compression ratio 6.7 at 3,600 r.p.m. Maximum

Fluid coupling, single- 3-speed gear box with cond and top. Steering Open two-piece propeller- inal drive. Overall ratios to 1. Reverse 18.22 to 1.

d Steering.—Independent rings and double wishbones. twin-piston dampers. Rigid half-elliptic springs and ampers. Worm and double Ratio 18.2 to 1.

ulic on four wheels. brake on rear wheels.

Wheels and Tyres.—7.00-15in tyres on bolt-on steel disc wheels.

Dimensions.—Wheelbase 10ft 5⅝in. Track 4ft 9½in (front); 4ft 11in (rear). Height (unladen) 5ft 5¾in. Weight (dry) 3,960lb.

MOSKVITCH

Engine.—4 cyl, 6.75 × 75 mm (1,074 c.c.). Side valves. Three-bearing crankshaft. Compression ratio 6 to 1. 24 b.h.p. at 3,600 r.p.m. Maximum torque 44.8 lb ft at 2,000 r.p.m.

Transmission.—Single-plate dry clutch. 3-speed gear box with synchromesh second and top. Steering column change. Open propeller-shaft. Hypoid final drive. Overall ratios 5.14, 8.9, 18.3 to 1.

Suspension and Steering.—Independent Dubonnet front suspension with coil springs, longitudinal arms and integral hydraulic dampers. Rigid rear axle with half-elliptic springs and hydraulic dampers. Worm and sector steering.

Brakes.—Hydraulic four-wheel brakes. Mechanical hand brake on rear wheels.

Wheels and Tyres.—5.00—16in tyres on steel disc wheels.

Dimensions.—Wheelbase 7ft 8⅛in. Track 3ft 7¾in (front); 3ft 10in (rear). Overall length 12ft 3½in. Width 4ft 7⅛in. Height (laden) 5ft 0⅜in. Kerk weight 1,856 lb.

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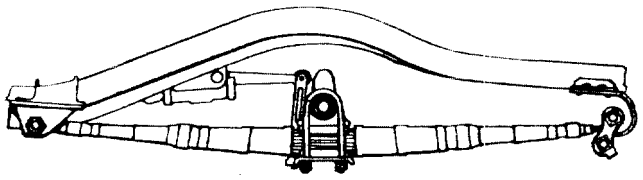

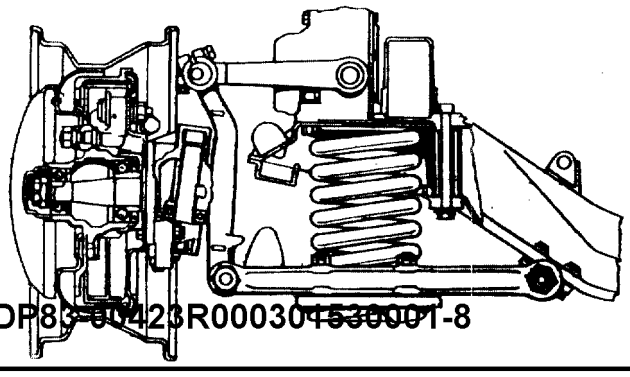

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